

## INTELLIVISION MEMORY MAP

0	- 003F	STIC CHIP	
0040	- 00FF	UNUSED	
0100	- 01EF	8 BIT RAM	0100-015C EXEC 8-bit RAM
01F0	- 01FF	SOUND - I/O CHIP	015D-01EF AVAIL 8-bit RAM
0200	- 035F	CONTROL RAM (16 BIT)	01FE Right Hand Controller 01FF Left Hand Controller
0360	- 03FF	UNUSED	no breakout
0400	- 04FF	EXEC ROM EXTENSION	
0500	- 05FF	UNUSED	
0600	- 06FF	EXEC ROM	
0700	- 07FF	UNUSED	
0800	- 08FF	GRAPHICS ROM (GROM)	
0900	- 09FF	GRAPHICS RAM (GRAM)	
0A00	- 0AFF	MAPPED FOR ADDITIONAL GRAM	
0B00	- 0BFF	UNUSED - CARTRIDGE EXPANSION	
0C00	- 0CFF	SPECIAL PROGRAMS	Cable TV Monitor
0D00	- 0DFF	CARTRIDGE ROM	
0E00	- 0EFF	CARTRIDGE EXPANSION	
0F00	- 0FFF	KEYBOARD	7000-7FFF CPU Monitor 7800-7FFF ROM Monitor
1000	- 10FF	TEST PROGRAMS	

8000-BFFF Dual Port RAM

8000-84FF

Reserved for monitor

8500-BFFF

available 10-bit RAM

C000-DFFF

(for speech synth)

E000-FFFF

"BASIC" Cartridge ROM

0080 SPEECH CHIP CONTROL

0081 SPEECH FIFO CONTROL

0082-00FF Addressable on Speech Peripheral Stack

0700-07FF



Received This  
Document from  
APL on 12-22-  
It represents  
their current  
thoughts on  
Address Space

Chuck Ridd  
Dave Chandler  
Cliff Perry  
Mark Sramet  
Gabriel Bauer

# MASTER COMPONENT MEMORY MAP

\$0000 - \$01FF	8bit Ram in MC
0200 - 035E	16bit Ram in MC
035F - 0FFF	Unavailable
1000 - 1FFF	Exec ROM
2000 - 2FFF	used by Voice unit
3000 - 37FF	GROM
3800 - 3FFF	GRAM (4 copies)
4000 - 47FF	Unused - Note that 4000-407F correspond to STIC memory
4800 - 4FFF	Cable TV Monitor
5000 - 5FFF	Unused - 4K, 8K, 12K, & 16 K Cartridges
6000 - 6FFF	Unused - 8K, 12K, 16 K Cartridges
7000 - 77FF	CPU 1 Monitor
7800 - 7FFF	Unused
8000 - 83FF	CPU 2 Monitor
8400 - 84FF	CPU 1 & CPU 2 Ram
8500 - BFFF	10-Bit Dual Port Ram
C000 - CFFF	Unused - 12K, 16 K Cartridges
D000 - DFFF	Unused - 16 K Cartridges
E000 - FFFF	Unused

## Notes -

The widget program typically resides at \$E000-\$FFFF.

Put all Cartridge extra Ram starting at \$4100 up to 47FF. Avoid locations 4000 - 407F as ROM or RAM to avoid messing up the STIC.

GROM / GRAM also "appears" at locations 7000-7FFF, 8000-BFFF, and F000-FFFF.

The Addon and the Widget program circumvent stomping on gram. Normal Cartridge programs do not. The only problem occurs when you try writing into one of these locations at interrupt level, which makes no sense for a ROM program anyway. If you do try writing any of the locations where Gram appears, you will alter Gram! Reading hurts nothing and you get what you want, and non-interrupt writing is also harmless.

Note also that locations \$0000-3FFF must be internal to the Master Component, so cartridges can not have RAM or ROM assigned to these addresses.

## OVERSIZE CARTRIDGE STANDARDS

4K Cartridges inhabit locations \$5000-5FFF  
8K Cartridges inhabit locations \$5000-6FFF  
12K Cartridges inhabit locations \$5000-6FFF and \$C000-CFFF  
16K Cartridges inhabit locations \$5000-6FFF and \$C000-DFFF

Extra Ram shall start at \$4100 and inhabit up to 47FF



## Development configurations

### 1) Oversize Cartridge Development Configuration - 8K, 12K, 16K with Ram

5000-5FFF	in normal widget	10/16 bit	4K
6000-6FFF	in extension	10/16 bit	4K
C000-DFFF	in extension	10/16 bit	4K
4400-4FFF	in extension overflow	10/16 bit	3K
4000-43FF	in extension <u>RAM</u>	8/16 bit	1K

### 2) Pseudo Cassette Development

8000-8FFF	in extension	10/16 bit	16K
widget will override gram/grom!			

### 3) Huge single chunk

C000-FFFF	in extension	10/16 bit	16K
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### 4) Alternate oversize Development Configuration

Normal widget wherever desired

4000-43FF	in Extension - <u>RAM</u>	8/16 Bit	1K
4400-7FFF	in Extension	10/16 bit	15K

December 16, 1981

TO: Stav Prodromou  
FROM: Dave Chandler  
SUBJECT: MASTER COMPONENT MEMORY MAP

It seemed appropriate to update the Memory Map for the Master Component at this time and include a number of the details.

This level of detail contains information which probably should not be given out freely to people outside the Company, but it will be valuable for those wanting to know the details of the assignments which have been made. A more simplified version was put together for the Japanese people.

*Dave*

DC/bb

cc: Hugh Barnes  
John Fairbanks  
Jim Haupt  
Chuck Rudd



## MASTER COMPONENT MEMORY MAP

0000 - 003F	STIC CHIP
0040 - 007F	UNUSED
0080 -	SPEECH CHIP CONTROL
0081 -	SPEECH FIFO CONTROL
0082 - 00FF	ADDRESSABLE ON SPEECH PERIPHERAL STACK
0100 - 01EF	8-BIT RAM
0100 - 015C	EXEC 8-BIT RAM
015D - 01EF	AVAILABLE 8-BIT RAM
01F0 - 01FF	SOUND - I/O CHIP
01F0 - 01FD	SOUND CHIP REGISTERS
01FE -	RIGHT HAND CONTROLLER
01FF -	LEFT HAND CONTROLLER
0200 - 035F	CONTROL RAM
0200 - 02EF	BACKTAB
02F0 -	EXEC POINTER TO CARTRIDGE UNIVERSAL DATA BASE
02F1 - 0318	STACK
0319 - 035F	EXEC 16-BIT RAM
0360 - 03FF	UNUSED
0400 - 04FF	EXEC ROM EXTENSION
0500 - 06FF	UNUSED
0700 - 0BFF	ADDRESSABLE ON SPEECH PERIPHERAL CHIP IN BLOCKS OF 256.
0C00 - 0FFF	UNUSED
1000 - 1FFF	EXEC ROM
2000 - 2FFF	UNUSED
3000 - 37FF	GROM
3800 - 39FF	GRAM
3A00 - 3FFF	MAPPED FOR ADDITIONAL GRAM
4000 - 47FF	*UNUSED - CARTRIDGE EXPANSION
4800 - 4FFF	SPECIAL PROGRAMS (PLAYCABLE MONITOR)
5000 - 5FFF	CARTRIDGE ROM
6000 - 6FFF	CARTRIDGE EXPANSION
7000 - 7FFF	KEYBOARD CPU 1 MOINTOR
8000 - BFFF	*KEYBOARD DUAL PORT RAM
8000 - 84FF	*RESERVED FOR MONITORS
8500 - BFFF	AVAILABLE 10-BIT RAM
C000 - FFFF	*UNUSED

\*4020, 4021, 8020, 8021, C020 and C021 MUST NOT BE USED BECAUSE THEY AFFECT STIC.

#205

August 13, 1982

TO: DISTRIBUTION  
FROM: CHUCK RUDD  
SUBJECT: MASTER COMPONENT MEMORY MAP

Attached is a copy of the final memory map, release date August 13, 1982.

Distribution

Hugh Barnes  
Gabriel Baum  
Ron Carlson  
Dave Chandler  
Jan Chodak  
John Day  
Greg Goodnight  
Gary Grant  
Jim Haupt  
Paris Jafari  
Wilson Quan  
Thom Randolph  
Ward Spaniol  
Richard Tuthill

CWR:1m

NOTE: Typed but not read

RECEIVED  
AUG 16 1982  
D. CHANDLER



MASTER COMPONENT MEMORY MAP

0000 - 003F	STIC CHIP
0040 - 007F	UNUSED
0080 -	SPEECH CHIP CONTROL
0081 -	SPEECH FIFO CONTROL
0082 - 00FF	ADDRESSABLE ON SPEECH PERIPHERAL STACK
0082 - 00DF	RESERVED FOR VOICE EXPANSION
00E0 - 00E4	LUCKY UART
00E0	TRANSMIT REGISTER
00E1	RECEIVE REGISTER
00E2	CONTROL REGISTER 1
00E3	CONTROL REGISTER 2.
00E4	STATUS REGISTER
00E5 - 00EF	UNUSED
00F0 - 00FF	LUCKY SOUND - I/O CHIP
00F0 - 00FD	SOUND CHIP REGISTERS
00FE	RIGHT HAND CONTROLLER
00FF	LEFT HAND CONTROLLER
0100 - 01EF	8 - BIT RAM
0100 - 015C	EXEC 8 - BIT RAM
015D - 01EF	AVAILABLE 8 - BIT RAM
01F0 - 01FF	SOUND - I/O CHIP
01F0 - 01FD	SOUND CHIP REGISTERS
01FE -	RIGHT HAND CONTROLLER
01FF -	LEFT HAND CONTROLLER
0200 - 035F	CONTROL RAM
0200 - 02EF	BACKTAB
02F0 -	EXEC POINTER TO CARTRIDGE UNIVERSAL DATA BASE
02F1 - 0318	STACK
0319 - 035F	EXEC 16 - BIT RAM
0360 - 03FF	UNUSED
0400 - 04FF	EXEC ROM EXTENSION
0500 - 06FF	UNUSED
0700 - 0BFF	ADDRESSABLE ON SPEECH PERIPHERAL CHIP IN BLOCKS OF 256.
0C00 - 0FFF	UNUSED
1000 - 1FFF	EXEC ROM

*note: This space is  
also on speech peripheral  
stack.*

2000 - 2FFF	LUCKY MONITOR
3000 - 37FF	GROM
3800 - 39FF	GRAM
3A00 - 3FFF	MAPPED FOR ADDITIONAL GRAM
4000 - 47FF	LUCKY 2K RAM
4800 - 4FFF	SPECIAL PROGRAMS (PLAYCABLE MONITOR, IMI CART)
5000 - 5FFF	CARTRIDGE ROM: 1st 4K SEGMENT
6000 - 6FFF	CARTRIDGE EXPANSION: 2nd 4K SEGMENT
7000 - 7FFF	KEYBOARD CPU 1 MONITOR & LUCKY MONITOR & POP MONITOR
8000 - BFFF	*KEYBOARD DUAL PORT RAM & LUCKY RAM EXPANSION
8000 - 84FF	*RESERVED FOR MONITORS
8500 - 8FFF	AVAILABLE 10 - BIT RAM
C000 - CFFF	IMI EXPANSION
D000 - DFFF	CARTRIDGE EXPANSION 3rd 4K SEGMENT
E000 - FFFF	CARTRIDGE EXPANSION (PAGED 4K SEGMENTS)

PAGE 0 - DEFAULT STANDARD FOR GENERAL CARTRIDGES

PAGE 1 -	} AVAILABLE FOR FUTURE EXPANSION
PAGE 2 -	
PAGE 3 -	
PAGE 4 -	
PAGE 5 -	
PAGE 6 -	

PAGE 7 - LUCKY EXTENDED BASIC

\*4020, 4021, 8020, 8021, C020, and C021 MUST NOT BE USED BECAUSE THEY AFFECT STIC. WHEN THE KEYBOARD OR LUCKY IS UTILIZED THESE ADDRESSES CAN BE UTILIZED WITHOUT ALTERING STIC STATUS.



0000 - 003F	STIC CHIP	
0040 - 007F	UNUSED	<i>reserved for potential use by coffee</i>
0080 -	SPEECH CHIP CONTROL	
0081 -	SPEECH FIFO CONTROL	
0082 - 00FF	ADDRESSABLE ON SPEECH PERIPHERAL STACK	
0082 - 00DF	RESERVED FOR VOICE EXPANSION	
00E0 - 00E4	LUCKY UART	
00E0	TRANSMIT REGISTER	
00E1	RECEIVE REGISTER	
00E2	CONTROL REGISTER 1	
00E3	CONTROL REGISTER 2	
00E4	STATUS REGISTER	
00E8 <sup>3</sup> - 00EF	UNUSED	
00F0 - 00FF	LUCKY SOUND - I/O CHIP	
00F0 - 00FD	SOUND CHIP REGISTERS	
00FE	RIGHT HAND CONTROLLER	
00FF	LEFT HAND CONTROLLER	
0100 - 01EF	8 - BIT RAM	
0100 - 015C	EXEC 8 - BIT RAM	
015D - 01EF	AVAILABLE 8 - BIT RAM	
01F0 - 01FF	SOUND - I/O CHIP	
01F0 - 01FD	SOUND CHIP REGISTERS	
01FE -	RIGHT HAND CONTROLLER	
01FF -	LEFT HAND CONTROLLER	
0200 - 035F	CONTROL RAM	
0200 - 02EF	BACKTAB	
02F0 -	EXEC POINTER TO CARTRIDGE UNIVERSAL DATA BASE	
02F1 - 0318	STACK	
0319 - 035F	EXEC 16 - BIT RAM	
0360 - 03FF	UNUSED	
0400 - 04FF	EXEC ROM EXTENSION	
0500 - 06FF	UNUSED	
0700 - 0BFF	ADDRESSABLE ON SPEECH PERIPHERAL CHIP IN BLOCKS OF 256.	
0C00 - 0FFF	UNUSED	
1000 - 1FFF	EXEC ROM	

*90-AF reserved for potential use by coffee*

2000 - 2FFF	LUCKY MONITOR
3000 - 37FF	GROM
3800 - 39FF	GRAM
3A00 - 3FFF	MAPPED FOR ADDITIONAL GRAM
4000 - 47FF	LUCKY 2K RAM
4800 - 4FFF	SPECIAL PROGRAMS (PLAYCABLE MONITOR, IMI CART)
5000 - 5FFF	CARTRIDGE ROM: 1st 4K SEGMENT
6000 - 6FFF	CARTRIDGE EXPANSION: 2nd 4K SEGMENT
7000 - 7FFF	KEYBOARD CPU 1 MONITOR & LUCKY MONITOR & POP MONITOR
8000 - BFFF	*KEYBOARD DUAL PORT RAM & LUCKY RAM EXPANSION
8000 - 84FF	*RESERVED FOR MONITORS
8500 - 8FFF	AVAILABLE 10 - BIT RAM
C000 - CFFF	IMI EXPANSION
D000 - DFFF	CARTRIDGE EXPANSION 3rd 4K SEGMENT
E000 - FFFF	CARTRIDGE EXPANSION (PAGED 4K SEGMENTS)

PAGE 0 - DEFAULT STANDARD FOR GENERAL CARTRIDGES

PAGE 1 -	} AVAILABLE FOR FUTURE EXPANSION
PAGE 2 -	
PAGE 3 -	
PAGE 4 -	
PAGE 5 -	
PAGE 6 -	

PAGE 7 - LUCKY EXTENDED BASIC

\*4020, 4021, 8020, 8021, C020, and C021 MUST NOT BE USED BECAUSE THEY AFFECT STIC. ~~WHEN THE KEYBOARD OR LUCKY IS UTILIZED THESE ADDRESSES CAN BE UTILIZED WITHOUT ALTERING STIC STATUS.~~



#224

September 3, 1982

TO: DISTRIBUTION  
FROM: CHUCK RUDD *CR*  
SUBJECT: MASTER COMPONENT MEMORY MAP

Attached is the memory map as we discussed on 8-25-82. If you have any corrections, please return them to me by 9-10-82.

Please keep this information extremely confidential, and limit its distribution to those who have a need to know.

Distribution

Hugh Barnes  
Dave Chandler  
Jan Chodak  
Bob DeCaro  
Greg Goodnight  
Glen Hightower (APH)  
Wilson Quan  
Ward Spaniol  
Richard Tuthill

MASTER COMPONENT MEMORY MAP

0000 - 003F	STIC CHIP
0040 - 007F	RESERVED FOR STIC EXPANSION
0080 -	SPEECH CHIP CONTROL
0081 -	SPEECH FIFO CONTROL
0082 - 00FF	ADDRESSABLE ON SPEECH PERIPHERAL STACK
0082 - 008F	RESERVED FOR VOICE EXPANSION
0090 - 00AF	RESERVED FOR COFFEE
00B0 - 00DF	RESERVED FOR VOICE EXPANSION
00E0 - 00E2	LUCKY UART
00E0	TRANSMIT REGISTER
00E0	RECEIVE REGISTER
00E1	CONTROL REGISTER 1/STATUS REGISTER
00E2	CONTROL REGISTER 2
00E3 - 00EF	UNUSED
00F0 - 00FF	LUCKY SOUND - I/O CHIP
00F0 - 00FD	SOUND CHIP REGISTERS
00FE	RIGHT HAND CONTROLLER
00FF	LEFT HAND CONTROLLER
0100 - 01EF	8 - BIT RAM
0100 - 015C	EXEC 8 - BIT RAM
015D - 01EF	AVAILABLE 8 - BIT RAM
01F0 - 01FF	SOUND - I/O CHIP
01F0 - 01FD	SOUND CHIP REGISTERS
01FE -	RIGHT HAND CONTROLLER
01FF -	LEFT HAND CONTROLLER
0200 - 035F	CONTROL RAM
0200 - 02EF	BACKTAB
02F0 -	EXEC POINTER TO CARTRIDGE UNIVERSAL DATA BASE
02F1 - 0318	STACK
0319 - 035F	EXEC 16 - BIT RAM
0360 - 03FF	UNUSED
0400 - 04FF	EXEC ROM EXTENSION
0500 - 06FF	UNUSED
0700 - 0BFF	ADDRESSABLE ON SPEECH PERIPHERAL CHIP IN BLOCKS OF 256.
0C00 - 0FFF	UNUSED
1000 - 1FFF	EXEC ROM



MASTER COMPONENT MEMORY MAP

2000 - 2FFF	<sup>1</sup> PAGED ROM FOR EXECS. PAGE 0-EXEC II, PAGE 1-LUCKY MONITOR (2 OF 2)
3000 - 37FF	GROM
3800 - 39FF	GRAM
3A00 - 3FFF	MAPPED FOR ADDITIONAL GRAM
4000 - 47FF	<sup>2</sup> LUCKY 2K RAM
4800 - 4FFF	SPECIAL PROGRAMS (PLAYCABLE MONITOR, IMI CART, POST 1982 POP)
5000 - 5FFF	CARTRIDGE ROM: 1st 4K SEGMENT
6000 - 6FFF	CARTRIDGE EXPANSION: 2nd 4K SEGMENT
7000 - 7FFF	<sup>3</sup> KEYBOARD CPU 1 MONITOR & LUCKY MONITOR (1 OF 2) PRE 1982 POP
8000 - BFFF	<sup>3</sup> KEYBOARD DUAL PORT RAM & LUCKY RAM EXPANSION ALL DEVICES UTILIZING THIS AREA MUST PROVIDE FOR 16 BIT WIDE RAM AND MASK OFF THE BITS THAT THE PARTICULAR DEVICE DOES NOT REQUIRE.
C000 - CFFF	<sup>4</sup> PAGED CARTRIDGE MEMORY & IMI EXPANSION
D000 - DFFF	CARTRIDGE EXPANSION 3rd 4K SEGMENT
E000 - EFFF	<sup>4</sup> PAGED CARTRIDGE MEMORY
F000 - FFFF	<sup>3</sup> UNUSED

<sup>1</sup>If a paged ROM is not available by LUCKY EXEC CODE release date, LUCKY EXEC will be the only user. EXEC II will then be specified at a different address.

<sup>2</sup>4000 to 403F, 8000 to 803F, C000 to C03F can be utilized for ROM or under special circumstances RAM. Addresses 4020, 4021, 8020, 8021, C020, and C021 within these bounds cannot be used because they affect STIC.

<sup>3</sup>7000 to 7FFF, B000 to BFFF, F000 to FFFF cannot be used unless the BUSS control lines are translated. If these areas are utilized without translation the DATA/ADDRESS buss will have contention between the external devices and the dual ported RAM (9600).

<sup>4</sup>PAGES ARE TYPICALLY IN 8K SEGMENTS: COMPOSED OF 2 4K ROMS SEPARATELY SELECTABLE

PAGE 0 - DEFAULT STANDARD FOR GENERAL CARTRIDGES

PAGE 1 -

PAGE 2 -

PAGE 3 - AVAILABLE FOR FUTURE EXPANSION

PAGE 4 -

PAGE 5 -

PAGE 6 -

PAGE 7 - LUCKY EXTENDED BASIC

PAGE 8-15 UNDEFINED

# INTELLIVISION CARTRIDGE PORT PIN OUT COMPARISONS

8/25/82

PIN NR	M/C (2609)	POP	VOICE	PLAYCABLE
1	GND	GND	GND	GND
2	GND	C1	C1	GND
3	MSYNC	MSYNC	MSYNC	MSYNC
4	CBLNK	C2	C2	N/C
5	DB7	BD7	DB7	DB7
6	EX AUD	EX AUD	EX AUDIO	N/C
7	DB8	BD8	DB8	DB8
8	EX VIDEO	GND	EXT VIDEO	GND
9	DB 6	BD6	DB6	DB6
10	MCLK	MCLK	MCLK	MCLK
11	DB9	BD9	DB9	DB9
12	RESET	RESET	RESET	GND
13	DB 5	BD5	DB5	DB5
14	SR 1	SOUT	SOUT	N/C
15	DB10	BD10	DB10	DB10
16	GND	C3	C3	N/C
17	DB4	BD4	DB4	DB4
18	GND	S IN	S IN	GND
19	DB11	BD11	DB11	DB11
20	GND	REN	REN	GND
21	DB3	BD3	DB3	DB3
22	GND	GND	GND	GND
23	DB12	BD12	DB12	DB12



24	GND	GND	GND	N/C
25	DB13	BD13	DB13	DB13
26	GND	GND	GND	N/C
27	DB2	BD2	DB2	DB2
28	GND	GND	GND	GND
29	DB 14	BD14	DB14	DB14
30	BUSAK	VOICECLK	RC1	N/C
31	DB1	BD1	DB1	DB1
32	BC1 IN	BC1 TO MC	BC1 IN	BC1
33	DB 0	BD0	DB0	DB0
34	BC2 IN	BC2 TO MC	BC2 IN	BC2
35	DB 15	BD15	DB15	DB15
36	BDIR IN	BDIR TO MC	BDIR IN	BDIR
37	BDIR OUT	BDIR FR MC	BDIR	BDIR
38	BDIR OUT	BDIR FR MC	BDIR OUT	BDIR
39	BC2 OUT	BC2 FR MC	BC2	BC2
40	BC2 OUT	BC2 FR MC	BC2 OUT	BC2
41	BC1 OUT	BC1 FR MC	BC1	BC1
42	BC1 OUT	BC1 FR MC	BC1 OUT	BC1
43	+5	VCC	VCC	N/C
44	GND	GND	GND	GND

PIN NR -----	GAME CART -----	LUCKY -----	INTELLIV II -----
1	GND	SIGNAL GROUND	GND
2	N/C	C1	<i>MUX CONTROL</i>
3	MSYNC	MSYNC	MSYNC

4.	N/C	C2	CBLNK
NOTE: IN LUCKY, ALL DATA LINES ARE BUFFERED.			
5.	DB7	DB7	DB7
6.	N/C	EXT AUDIO	EXT AUDIO
7	DB8	DB8	DB8
8.	GROUND	EX VIDEO	EX VIDEO
9	DB6	DB6	DB6
10	GND	MCLK (BUFFERED)	MCLK
11	DB9	DB9	DB9
12	GROUND	RESET	RESET
13	DB5	DB5	DB5
14	N/C	S OUT	SR 1
15	DB 10	DB10	DB 10
16	GND	C3	GND
17	DB4	DB4	DB4
18	GND	S IN	GND
19	DB 11	DB11	DB11
20	GND	REN	GND
21	DB3	DB3	DB3
22	GND	RF GND	GND
23	DB 12	DB12	DB 12
24	GND	RF GND	GND
25	DB 13	DB13	DB13
26	GND	RF GND	GND
27	DB2	DB2	DB2
28	GND	GND	GND



29	DB 14	DB14	DB 14
30	N/C	RCL	BUSAK
31	DB 1	DB1	DB1
32	TIED TO 42	BC1 IN	BC1 IN
33	DB 0	DB0	DB0
34	TIED TO 40	BC2 IN	BC2 IN
35	DB 15	DB15	DB 15
36	TIED TO 38	BDIR IN	BDIR IN
37	BDIR	BDIR OUT	BDIR OUT
38	TIED TO 36	BDIR OUT	BIDR OUT
39	BC2	BC2 OUT	BC2 OUT
40	TIED TO 34	BC2 OUT	BC2 OUT
41	BC1	BC1 OUT	BC1 OUT
42	TIED TO 32	BC1 OUT	BC1 OUT
43	VCC	VCC (BUFFERED)	+ 5
44	GND	SIGNAL GND	GND

8/25/82, SAVED DISC 10, BUS COMPARISON